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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,349	10/11/2001	Thomas S. Moore	705699US1	1359

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EXAMINER
THOMPSON, CAMIE S

ART UNIT	PAPER NUMBER
1774	

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DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/976,349	MOORE ET AL.	
	Examiner	Art Unit	
	Camie S Thompson	1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5-13,16,17 and 19-21* is/are pending in the application.

4a) Of the above claim(s) *21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5-13, 16-17 and 19-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendment and accompanying remarks filed March 8, 2004 have been acknowledged.

2. Examiner acknowledges newly added claim 21. Newly submitted claim 21 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claim 21 is directed to the method of forming a composite material. Claims 5-13 and 16-17 and 19-20 are directed to a composite material and coupled fiber reinforcement structure.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 21 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 5, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bompard, U.S. Patent Number 4,257,835 in view of Moghe et al., U.S Patent Number 5,127,783. Bompard discloses densified layers of fibers that are at right angles to each other as per instant claim 5 (see abstract and column 1, lines 5-18). Additionally, the Bompard reference discloses that the fibers can be carbon fibers and that the stacked layers of densified fibers are constituted

by parallel fibers in at least first and second directions as per instant claim 5 (see column 1, lines 15-68). Also, Bompard discloses in column 3, lines 54-59 that the fibrous layers are orthogonal to each other as per instant claim 5. The reference also discloses that a reinforced composite is produced from impregnating the fibers in a thermosetting resin as per instant claim 7 (see column 2, lines 45-59).

The Bompard reference does not disclose the use of a thermosetting resin such as a polyimide resin. Moghe teaches carbon fiber reinforced composites wherein the carbon fibers can be twisted/coupled (see column 3, lines 42-68 and claim 19). In addition, the Moghe reference teaches that the binder system include a resin such a polyimide resin as per instant claims 7 and 9 (see column 7, lines 21-46). Polyimide resins function below their decomposition temperature. Therefore, it would have been obvious to one of ordinary skill in the art to use a polyimide resin as the thermosetting resin because polyimide resins volitalize and leave no carbon char (see Moghe: column 7, lines 21-46).

5. Claims 5, 10-11, 16-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bompard, U.S. Patent Number 4,257,835 in view of Segal et al., U.S. Patent 3,920,879.

Bompard discloses densified layers of fibers that are at right angles to each other as per instant claim 5 (see abstract and column 1, lines 5-18). Additionally, the Bompard reference discloses that the fibers can be carbon fibers and that the stacked layers of densified fibers are constituted by parallel fibers in at least first and second directions as per instant claim 5 and 17(see column 1, lines 15-68). Also, Bompard discloses in column 3, lines 54-59 that the fibrous layers are

orthogonal to each other as per instant claim 5. Bompard does not disclose the use of a thermoformable polymer matrix such as polyamide resin. Segal teaches long glass fiber reinforcement wherein the fibers are intertwined or agglomerated long glass fibers held together by adhesive resinous binders or mechanically bound as per instant claim 16(see abstract and column 4, lines 16-44). In addition, the Segal reference discloses that the polymer used in the reinforcement is polyamide as per instant claims 10 and 11 (see column 4, lines 16-44). Polyamide resins are low molecular weight resins. Therefore, it would have been obvious to one of ordinary skill in the art to use a polyamide resin in order obtain a mold that is shapable with higher strengths as taught by Segal in column 5, lines 1-19.

The Bompard reference does not disclose the length of the fiber as per instant claim 19. The length of the fibers affects the strength. However, this is an optimizable feature. Discovery of optimum values of result effective variables involves only routine skill in the art in re Boesch, 617 F2. 2d 272, 205 USPQ 215 (CCPA). Therefore, it would have been obvious to one of ordinary skill in the art to have the length of the fibers between 0.2 to 0.8 mm in order to have an effective load bearing strength.

Neither reference discloses the diameter of the fiber as per instant claim 20. The diameter of the fibers affects the load bearing features of the composite. Discovery of optimum values of result effective variable involves only routine skill in the art in re Boesch, 617 F2. 2d 272, 205 USPQ 215 (CCPA). Therefore, it would have been obvious to one of ordinary skill in the art to have a diameter of five to twenty micrometers for the fibers in order to obtain a composite with a more efficient load bearing properties.

Response to Arguments

6. Applicant's arguments filed March 8, 2004 have been fully considered but they are not persuasive. Applicant argues that Bompard reference does not disclose a coupled fiber reinforcement structure. Bompard discloses that the parallel fibers in the densified layers are one above the other, which couples the fibers together (see column 2, lines 45-50). Additionally, Bompard discloses the structure comprising the parallel fibers is a reinforced three-dimensional structure (see column 4, lines 43-45). In the Bompard reference, the fibers of the first layer are couple one above the other with the fibers of the second layer. Applicant argues the combination of the Bompard reference with the Moghe reference. The Bompard reference discloses a coupled fiber reinforced structure wherein the fibers of the first layer are parallel and coupled with the fibers of the second layer. Both Bompard and Moghe are directed towards fiber reinforcement, and thus are analogous art. Applicant argues that the method of weaving the fabric layer in the Moghe reference is a different application from the Bompard reference. Both Bompard and Moghe disclose fiber reinforcements. Fiber reinforcement structures using carbon fibers can volatize. The use of a polyimide resin leaves no carbon char as disclosed in the Moghe reference. Therefore, the combination of Bompard and Moghe is not without motivation. Applicant argues the combination of the Bompard and Segal references. Both Bompard and Segal are directed to fiber reinforcement composites, and thus are analogous art. Additionally, the Bompard reference discloses a coupled fiber reinforced structure wherein the fibers of the first layer are parallel and coupled with the fibers of the second layer. Segal discloses that the length of the fibers in the reinforcement affects the strength of the fiber composite. Although Segal does not specifically disclose the length of the fibers as being 0.2 to 0.8 mm, this is an

optimizable feature. Optimizing the length of the fibers affect the load bearing capabilities of the composite. Also, applicant argues that the Segal reference does not disclose that a joint adjoins the fibers reinforcement. Segal discloses a fiber reinforcement that is intertwined and can be mechanically bound, which would be at a joint within the reinforcement. The joining of the fibers allows for shapability of the composite. Therefore, the combination of Bompard with Segal is not without motivation. The rejections are maintained.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Camie S. Thompson whose telephone number is (571) 272-1530. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly, can be reached at (571) 272-1526. The fax phone number for the Group is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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